

ANALYTICAL DEVICE

Blood is a complex mixture of particles and organic molecules in solution. In blood analysis—such as the routine blood test—a biochemist must determine the presence and amount of specific blood constituents without interference from other compounds in the mixture. A widely used method of doing that is electrophoresis, a process whereby the components of a fluid are separated by electric current.

In the mid-sixties, Ames Research Center sponsored development of an automated electrophoresis device that would work in the weightless environment of space; it was intended for use in a monkey-carrying spacecraft to provide information on blood behavior in zero gravity, but it did not reach flight status. In 1972, a modified system was planned for use in the Skylab interim space station to study possible changes in astronauts' blood during long-term weightlessness; again it did not fly in space, although it was used in simulated weightlessness studies at Ames. Because the project had produced considerable advanced technology, the device was revived once more in the mid-seventies, this time as a technology utilization project aimed at an automated system for Earth use.

Ames contracted with the investigator who had developed the original device—Dr. Benjamin W. Grunbaum of the University of California at Berkeley—for development of an advanced system that became known as the Grunbaum System for Electrophoresis. It is a versatile, economical assembly for rapid separation of specific blood proteins in very small quantities, permitting their subsequent identification and quantification. The system is capable of handling 10 to 20 samples simultaneously.

The Grunbaum system became a commercial product in 1982, produced under NASA license by Sartorius Filters, Inc., Hayward, California, an international



company headquartered in Goettingen, West Germany. Known commercially as the Sartophor® System for Electrophoresis (above), it is both a research instrument and a diagnostic aid, with many applications in medicine, law enforcement science, pathology, biochemistry and other biological sciences; as a system for analyzing substances other than blood, it offers applications in the food, agriculture, cosmetic and pharmaceutical industries. Below, a researcher at Vanderbilt University, Nashville, Tennessee is using the Sartophor system in a study of the functions of proteins.

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